

**I CLAIM:**

- 1 1. A flex circuit assembly for use in a head stack assembly, the flex circuit assembly
- 2 comprising:
- 3 a flex circuit base film;
- 4 an integrated circuit device disposed adjacent the flex circuit base film and including
- 5 a solder bump connection;
- 6 an electrically conductive trace disposed upon the flex circuit base film, the trace
- 7 including a contact pad, the contact pad electrically connected to the solder bump
- 8 connection;
- 9 an underfill portion disposed between the flex circuit base film and the integrated
- 10 circuit device for attaching the integrated circuit device to the flex circuit base film, the
- 11 underfill portion being formed of an underfill material; and
- 12 a glob top portion disposed upon the underfill portion and the flex circuit base film
- 13 for sealing the electrically conductive trace, the glob top portion being formed of a glob top
- 14 material, the glob top material being different than the underfill material.

- 1 2. The flex circuit assembly of Claim 1 wherein the underfill material is a no-flow  
2 encapsulant.
- 1 3. The flex circuit assembly of Claim 1 wherein the underfill material is a capillary flow  
2 encapsulant.
- 1 4. The flex circuit assembly of Claim 1 further includes a flex circuit cover film disposed  
2 upon the flex circuit base film, the flex circuit cover film includes an opening, the integrated  
3 circuit device and the electrically conductive trace are disposed within the opening.
- 1 5. The flex circuit assembly of Claim 4 wherein the underfill portion and the glob top portion  
2 are disposed within the opening.
- 1 6. The flex circuit assembly of Claim 1 wherein the underfill portion has a coefficient of  
2 thermal expansion between coefficients of thermal expansion of the integrated circuit device and  
3 the flex circuit base film.
- 1 7. The flex circuit assembly of Claim 1 wherein the underfill portion has a coefficient of  
2 thermal expansion greater than a coefficient of thermal expansion of the glob top portion.

- 1     8.     A head stack assembly for use in a disk drive, the head stack assembly comprising:
- 2             a rotary actuator; and
- 3             a flex circuit assembly attached to the rotary actuator, the flex circuit assembly
- 4     including:
- 5             a flex circuit base film;
- 6             an integrated circuit device disposed adjacent the flex circuit base film and
- 7     including a solder bump connection;
- 8             an electrically conductive trace disposed upon the flex circuit base film, the
- 9     trace including a contact pad, the contact pad electrically connected to the solder
- 10    bump connection;
- 11            an underfill portion disposed between the flex circuit base film and the
- 12    integrated circuit device for attaching the integrated circuit device to the flex circuit
- 13    base film, the underfill portion being formed of an underfill material; and
- 14            a glob top portion disposed upon the underfill portion and the flex circuit
- 15    base film for sealing the electrically conductive trace, the glob top portion being
- 16    formed of a glob top material, the glob top material being different than the underfill
- 17    material.

- 1 9. The head stack assembly of Claim 8 wherein the underfill material is a no-flow encapsulant.
- 1 10. The head stack assembly of Claim 8 wherein the underfill material is a capillary flow  
2 encapsulant.
- 1 11. The head stack assembly of Claim 8 further includes a flex circuit cover film disposed  
2 upon the flex circuit base film, the flex circuit cover film includes an opening, the integrated  
3 circuit device and the electrically conductive trace are disposed within the opening.
- 1 12. The head stack assembly of Claim 11 wherein the underfill portion and the glob top portion  
2 are disposed within the opening.
- 1 13. The head stack assembly of Claim 8 wherein the underfill portion has a coefficient of  
2 thermal expansion between coefficients of thermal expansion of the integrated circuit device and  
3 the flex circuit base film.
- 1 14. The head stack assembly of Claim 8 wherein the underfill portion has a coefficient of  
2 thermal expansion greater than a coefficient of thermal expansion of the glob top portion.

- 1     15.     A disk drive comprising:
- 2             a disk drive base; and
- 3             a head stack assembly rotatably coupled to the disk drive base, the head stack
- 4     assembly including:
- 5             a rotary actuator; and
- 6             a flex circuit assembly attached to the rotary actuator, the flex circuit
- 7     assembly including:
- 8             a flex circuit base film;
- 9             an integrated circuit device disposed adjacent the flex circuit base
- 10     film and including a solder bump connection;
- 11             an electrically conductive trace disposed upon the flex circuit base
- 12     film, the trace including a contact pad, the contact pad electrically connected
- 13     to the solder bump connection;
- 14             an underfill portion disposed between the flex circuit base film and
- 15     the integrated circuit device for attaching the integrated circuit device to the
- 16     flex circuit base film, the underfill portion being formed of an underfill
- 17     material; and
- 18             a glob top portion disposed upon the underfill portion and the flex
- 19     circuit base film for sealing the electrically conductive trace, the glob top
- 20     portion being formed of a glob top material, the glob top material being
- 21     different than the underfill material.

- 1 16. The disk drive of Claim 15 wherein the underfill material is a no-flow encapsulant.
- 1 17. The disk drive of Claim 15 wherein the underfill material is a capillary flow encapsulant.
- 1 18. The disk drive of Claim 15 further includes a flex circuit cover film disposed upon the  
2 flex circuit base film, the flex circuit cover film includes an opening, the integrated circuit device  
3 and the electrically conductive trace are disposed within the opening.
- 1 19. The disk drive of Claim 18 wherein the underfill portion and the glob top portion are  
2 disposed within the opening.
- 1 20. The disk drive of Claim 15 wherein the underfill portion has a coefficient of thermal  
2 expansion between coefficients of thermal expansion of the integrated circuit device and the flex  
3 circuit base film.
- 1 21. The disk drive of Claim 15 wherein the underfill portion has a coefficient of thermal  
2 expansion greater than a coefficient of thermal expansion of the glob top portion.